Gross Anatomical and Biometrical Studies on the Heart and its Associated Blood Vessels in Buffalo (Bubalus bubalis) of Mathura Region

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ABSTRACT

The study was conducted on heart of 10 non-descript male buffalo calves of approximately 1 year of age. The heart of buffalo calf was cone shaped. Its base was wide and extended from cranial border of the 3rd rib to caudal border of 5th rib, whereas, apex was conical. Total length of heart was found to be correlated with length and width of left and right atrium, length of right as well as left ventricle, circumference of aorta and descending aorta. The circumference of aorta was correlated with circumference of descending aorta, cranial venacava, caudal venacava, thickness of wall of pulmonary artery and wall of left ventricle.

Key words: Biometry, Gross anatomy, Heart

The knowledge of position and normal biometry of heart is very important for the diagnosis of diseases and corrective surgical manipulation. The general description regarding heart of ox, horse, dog, goat and pig is available in many text books of veterinary anatomy. The present study describes the anatomical position and biometry of heart and large blood vessels in detail in buffalo calves (Bubalus bubalis) of Mathura region.

MATERIALS AND METHODS

The study was conducted on heart of 10 healthy male buffalo calves up to 1 year of age, procured for the undergraduate teaching. The age of the animal was recorded with the help of dentition before embalming. The hearts were thoroughly cleaned. Various biometrical parameters were taken with the help of metric scale, non-stretchable thread and Vernier callipers. The biometrical parameters were analyzed statistically (Snedecor and Cochran, 1980).

RESULTS AND DISCUSSION

The total length of heart was 16.74±1.19 cm whereas, latero-medial and cranio-caudal widths were 12.83±1.6 and 13.18±1.18 cm, respectively. The circumference of the heart at coronary groove was 23.26±1.17 cm. Panhwar et al., (2007) reported the same parameters in young male and female buffalo calves that were 27.6±0.40 and 26.0±0.51cm, respectively. The base of the heart in buffalo calf was wide and lay opposite to the cranial border of 3rd rib to caudal border of 5th rib as described by Sisson and Grossman (1974) in ox and Panhwar et al. (2007) in buffalo. It lay above the last segment of the sternum at the level of caudal border of the sterno-costal junction as reported earlier in adult female Murrah buffalo (Dhingra and Sharma, 1978).

The cranial border of the heart was strongly convex as reported in ox and horse (Sisson and Grossman, 1974) and adult female Murrah buffalo (Dhingra and Sharma, 1978). It lay opposite to the caudal border of the 2nd rib and was related with the apical lobe of the right lung. The caudal border was convex in its upper part but concave in its lower part. It was related with small part of the diaphragm and diaphragmatic lobe of the left lung. The coronary groove indicated the division of heart into upper atrium and lower ventricles and it was filled with fat. The external length and width of the left atrium was 4.75±0.72 and 7.02±0.72 cm, respectively. The same parameters of right atrium were 4.86±1.22 and 12.23±2.31 cm, respectively. The same parameters of right atrium were 4.86±1.22 and 12.23±2.31 cm, respectively. The base of the heart was at the level of 3rd rib and it was 23.87±0.72 cm below the summit of third thoracic vertebra. The opening of caudal venacava was
located at the level of cranial border of 5th rib and was about 24.46±1.23 cm below the summit of fifth thoracic vertebra. The external length and width of right ventricle were 9.95±0.81 and 11.33±1.32 cm, respectively. The pulmonary artery originated from the base of the right ventricle. The thickness of its wall at its origin was 0.27±0.02 cm, whereas its circumference was 8.92±0.51 cm. The external length and width of left ventricle were 11.46±1.23 and 12.76±1.03 cm, respectively. The aorta originated from the base of left ventricle. The thickness of its wall at its origin was 0.41±0.02 cm and its circumference was 9.18±1.02 cm. Thus, the wall of the aorta was always thicker than the wall of pulmonary artery. The distance of conus arteriosus from the summit of third thoracic vertebra was 21.26±2.05 cm. The circumference of brachiocephalic trunk was 5.5±0.19 cm and the thickness of its wall was 0.30±0.01 cm, whereas, the circumference of descending aorta was 7.49±0.54 cm and the thickness of its wall was 0.39±0.02 cm. The circumference of descending aorta was always higher than the circumference of brachiocephalic trunk. The diameter of cranial and caudal venacava was 4.5±0.4 and 5.8±0.60 cm, respectively. The thickness of the wall of left and right ventricles of the heart was 1.70±0.15 and 0.79±0.07 cm, respectively. Thus, the wall of left ventricle was approximately 2.16 times more than the wall of right ventricle. The thickness of the interventricular septum was 2.11±0.18 cm. The thickest moderator band was present in the right ventricle. Its thickness was 0.36±0.05 cm. In the left ventricle, the moderator bands were thin and 3-4 in numbers.

The statistical analysis of the data revealed that many external parameters of the heart showed significant correlation coefficient with internal parameters of the heart. The total length of heart was found to be significantly correlated with the length of right atrium (0.82) and left atrium (0.66) at 1% and 5% level of significance, respectively. It was also correlated with the length of right ventricle (0.67) and left ventricle (0.75). The total length of heart was correlated with circumference of aorta (0.79) and circumference of posterior venacava (0.61). Length of right atrium and left atrium was significantly correlated with circumference of aorta and thickness of wall of left ventricle at 1% level of significance. These closely correlated external parameters can be used to determine the internal parameters of the heart.

REFERENCES


